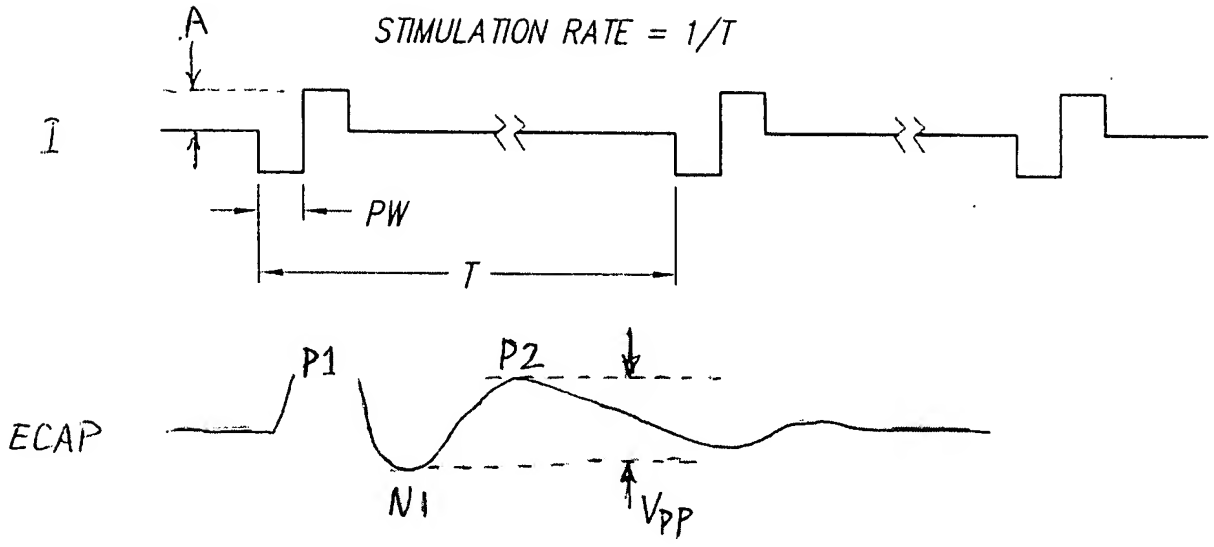

A
STIMULATION RATE = 1/T
I
PW
T
P1
P2
ECAP
N1
V_{PP}

FIG. 1

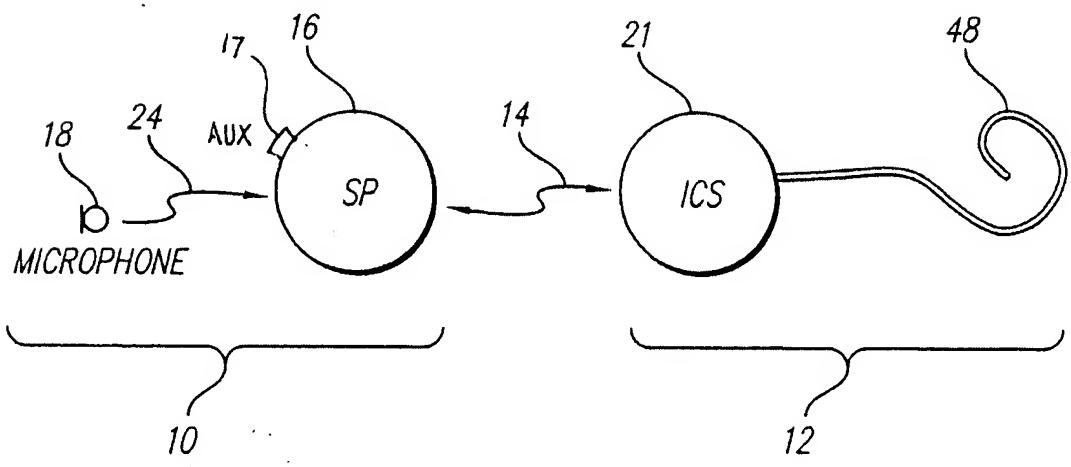

17
16
21
48
18
24
AUX
14
SP
ICS
MICROPHONE
10
12

FIG. 2A

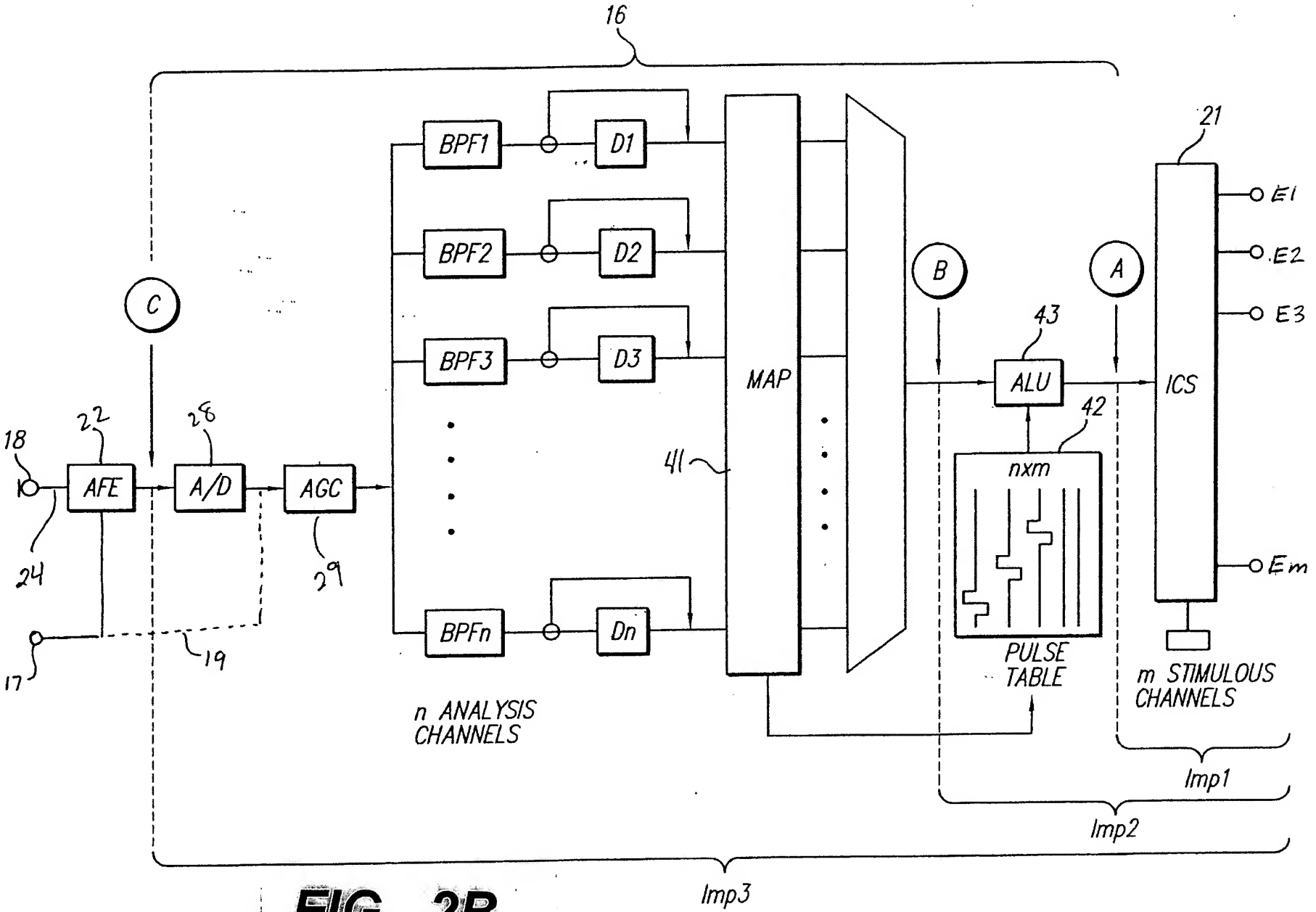

16
21
BPF1
D1
BPF2
D2
BPF3
D3
BPFn
Dn
MAP
41
B
A
43
ALU
ICS
42
nxm
PULSE TABLE
E1
E2
E3
Em
m STIMULOUS CHANNELS
n ANALYSIS CHANNELS
C
18
22
AFE
28
A/D
AGC
24
29
17
19
Imp1
Imp2
Imp3

FIG. 2B

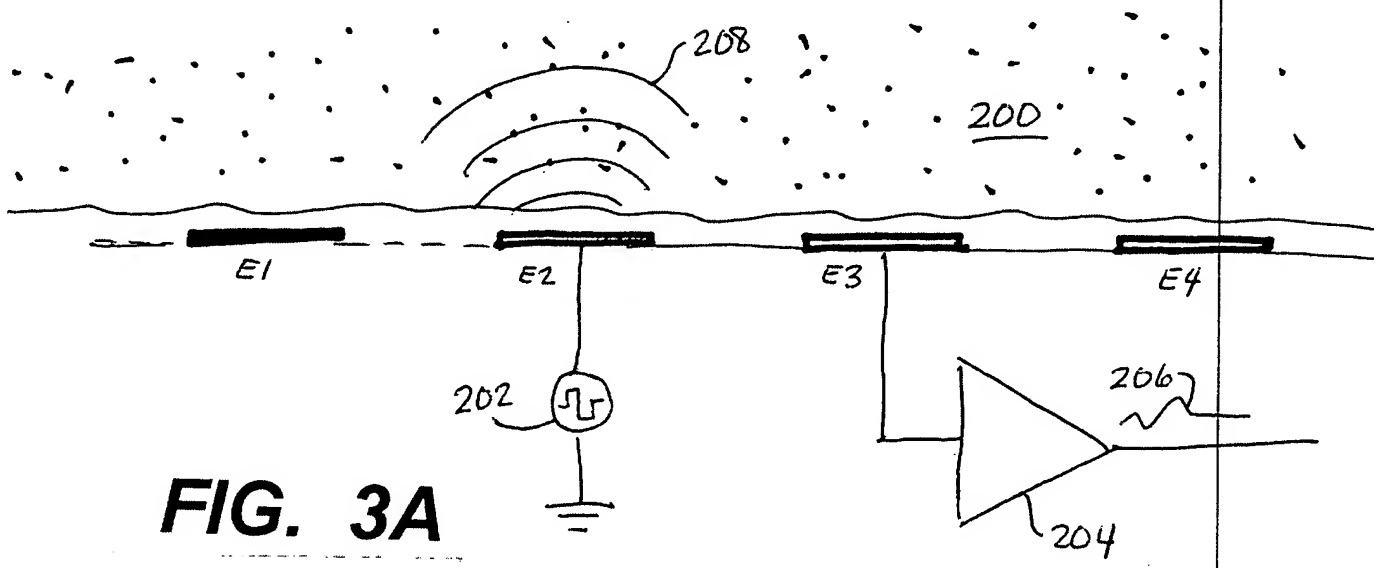


FIG. 3A

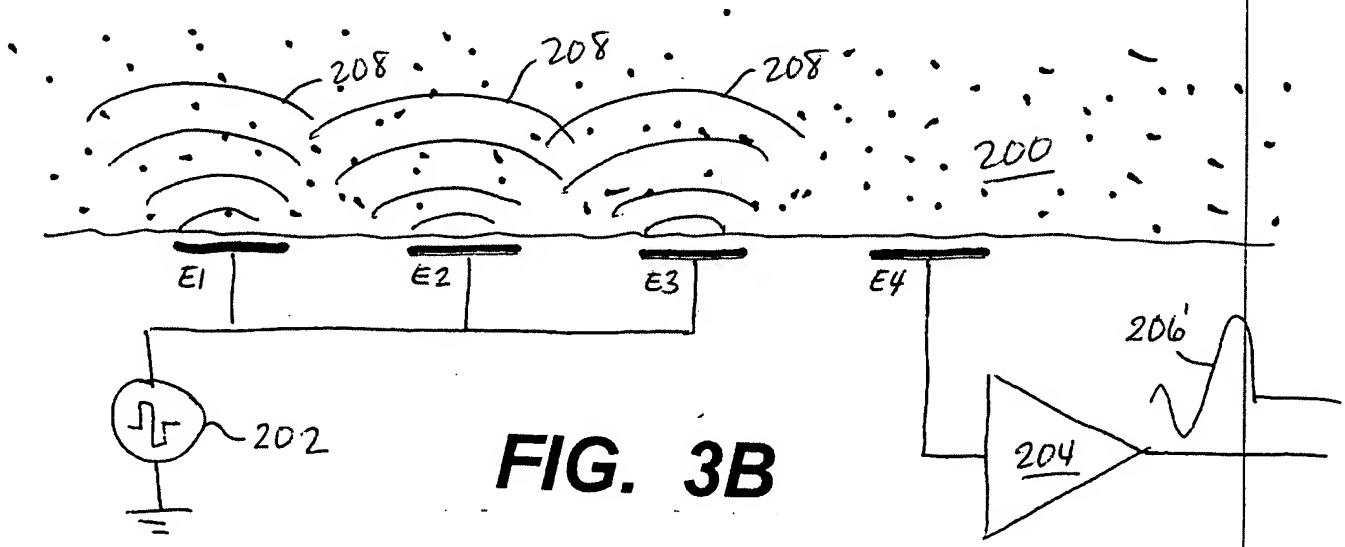


FIG. 3B

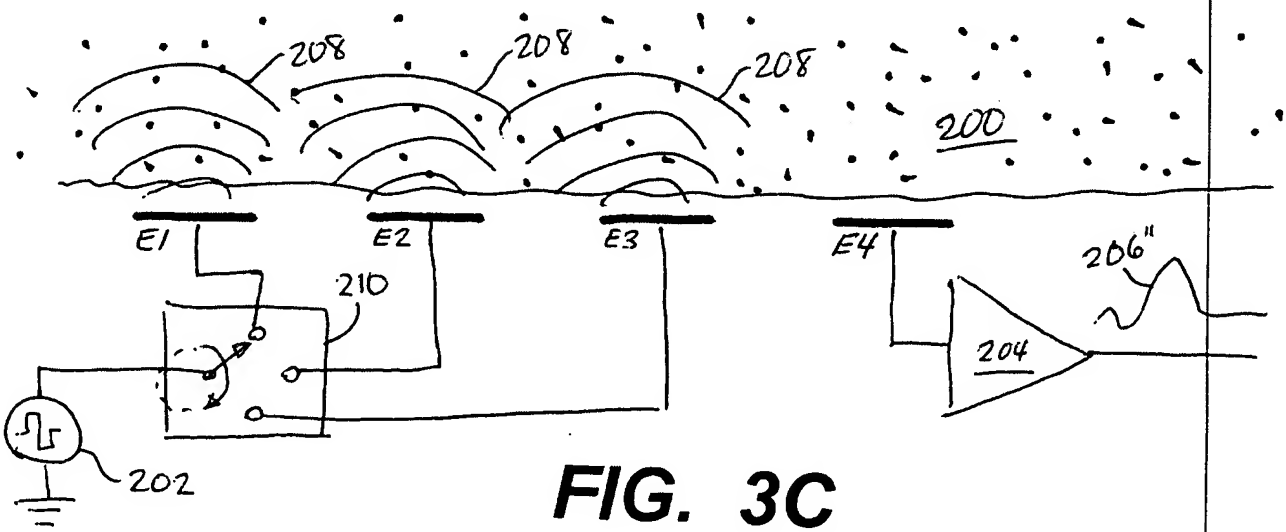


FIG. 3C

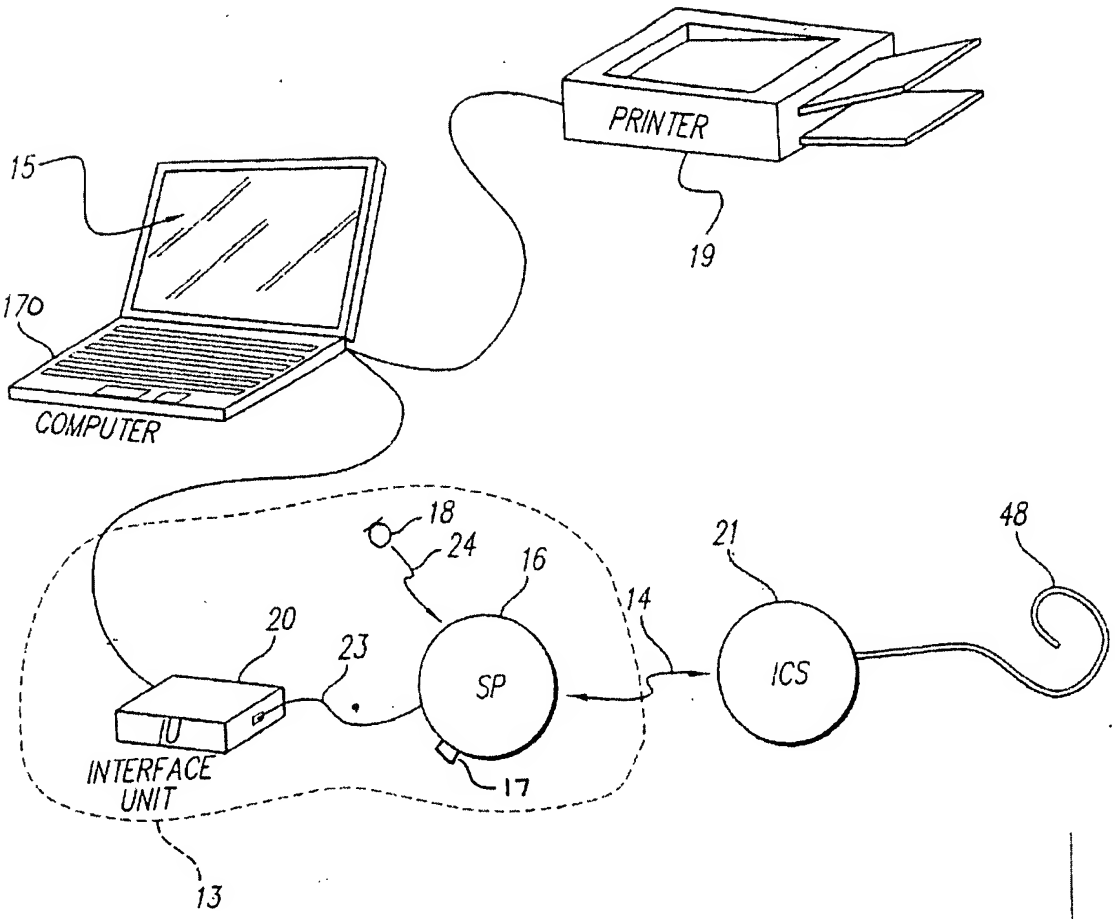

PRINTER
19
15
17o
COMPUTER
18
24
16
21
48
20
23
14
SP
ICS
IU
INTERFACE
UNIT
17
13

FIG. 4A

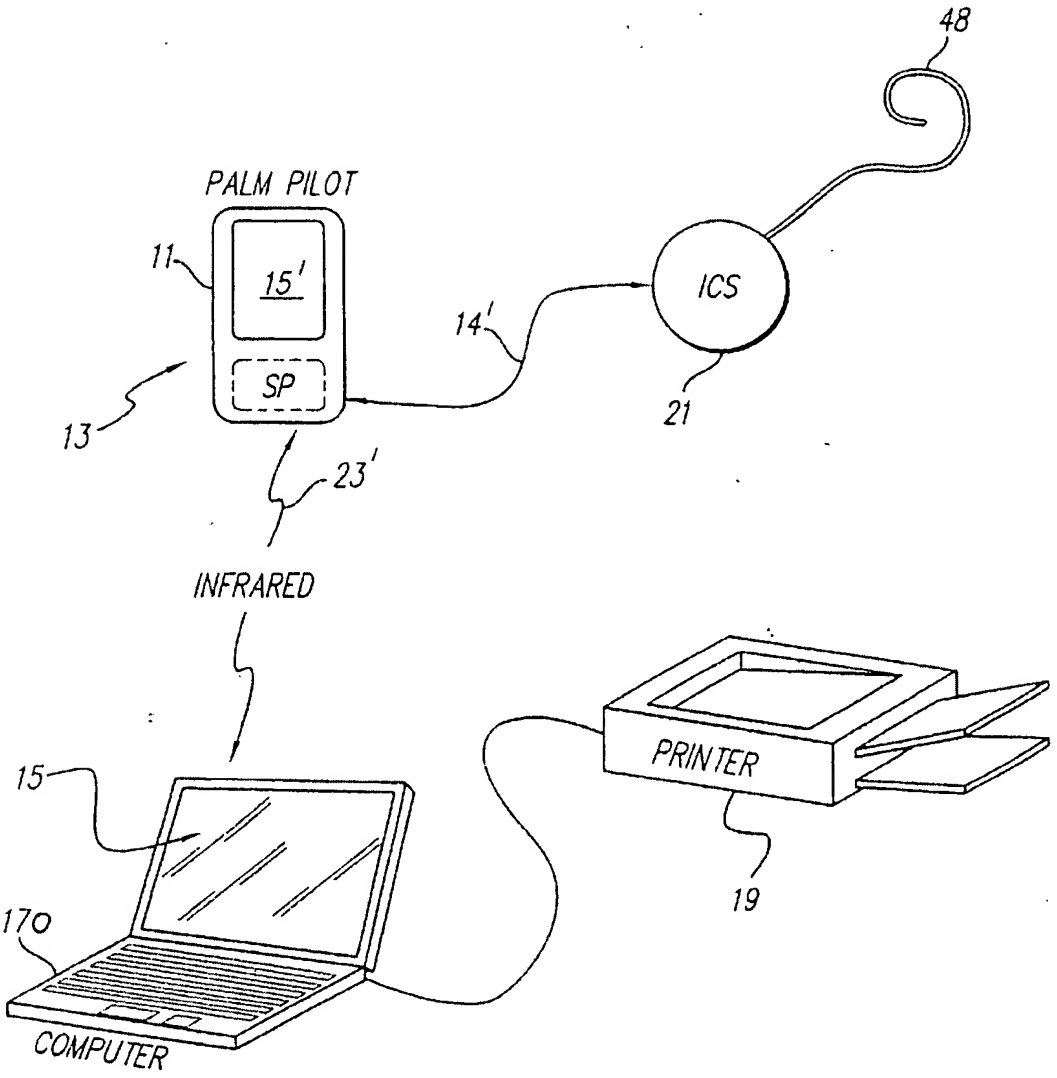

48
PALM PILOT
11
15'
SP
13
14'
ICS
21
23'
INFRARED
15
170
COMPUTER
PRINTER
19

FIG. 4B

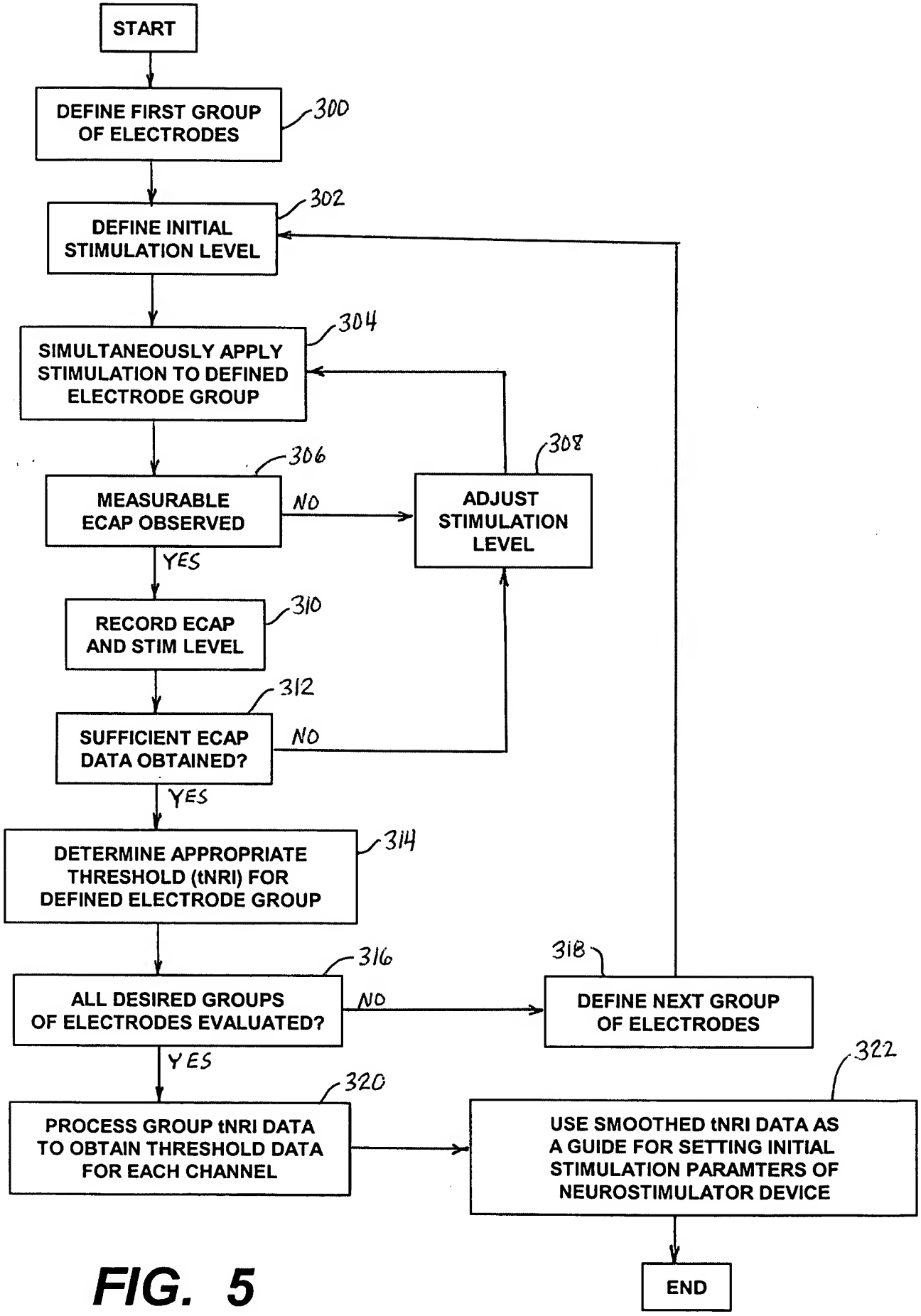

START
DEFINE FIRST GROUP OF ELECTRODES
300
DEFINE INITIAL STIMULATION LEVEL
302
SIMULTANEOUSLY APPLY STIMULATION TO DEFINED ELECTRODE GROUP
304
MEASURABLE ECAP OBSERVED
306
NO
ADJUST STIMULATION LEVEL
308
YES
RECORD ECAP AND STIM LEVEL
310
SUFFICIENT ECAP DATA OBTAINED?
312
NO
YES
DETERMINE APPROPRIATE THRESHOLD (tNRI) FOR DEFINED ELECTRODE GROUP
314
ALL DESIRED GROUPS OF ELECTRODES EVALUATED?
316
NO
DEFINE NEXT GROUP OF ELECTRODES
318
YES
PROCESS GROUP tNRI DATA TO OBTAIN THRESHOLD DATA FOR EACH CHANNEL
320
USE SMOOTHED tNRI DATA AS A GUIDE FOR SETTING INITIAL STIMULATION PARAMTERS OF NEUROSTIMULATOR DEVICE
322
END

FIG. 5

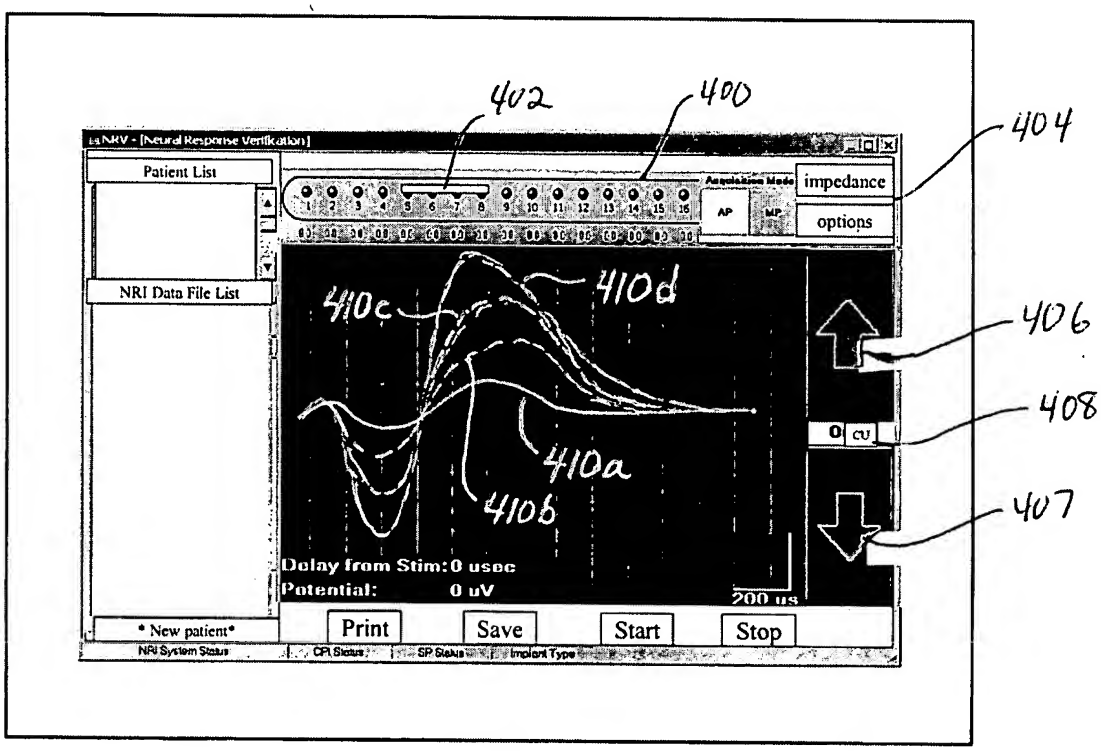

402
400
404
406
408
407
410c
410d
410a
410b
Patient List
NRI Data File List
impedance
options
AP
MP
Delay from Stim: 0 usec
Potential: 0 uV
200 us
Print
Save
Start
Stop
* New patient*
NRI System Status
CPI Status
SP Status
Implant Type

FIG. 6A

By clicking options one sees the following

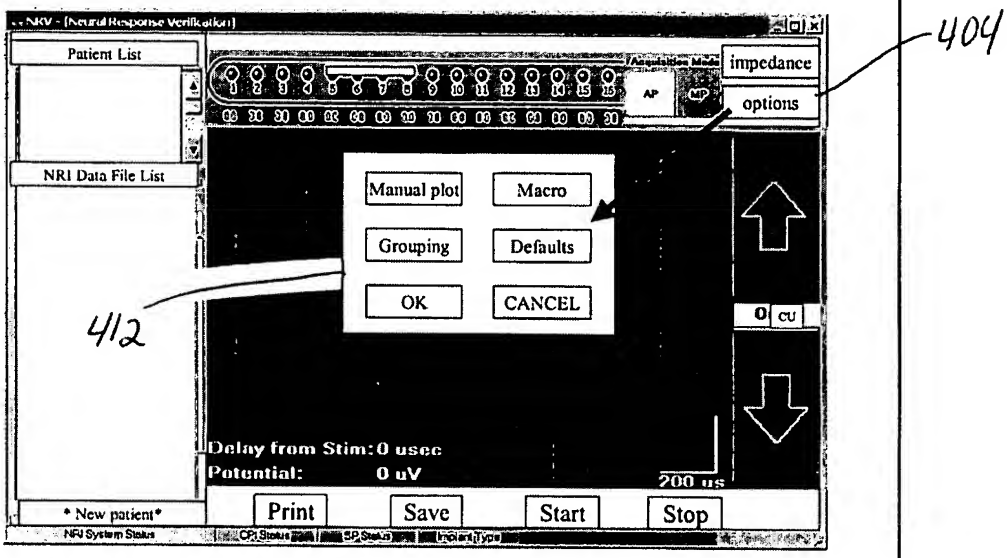


FIG. 6B

Selecting manual plots allows one to plot NRV files

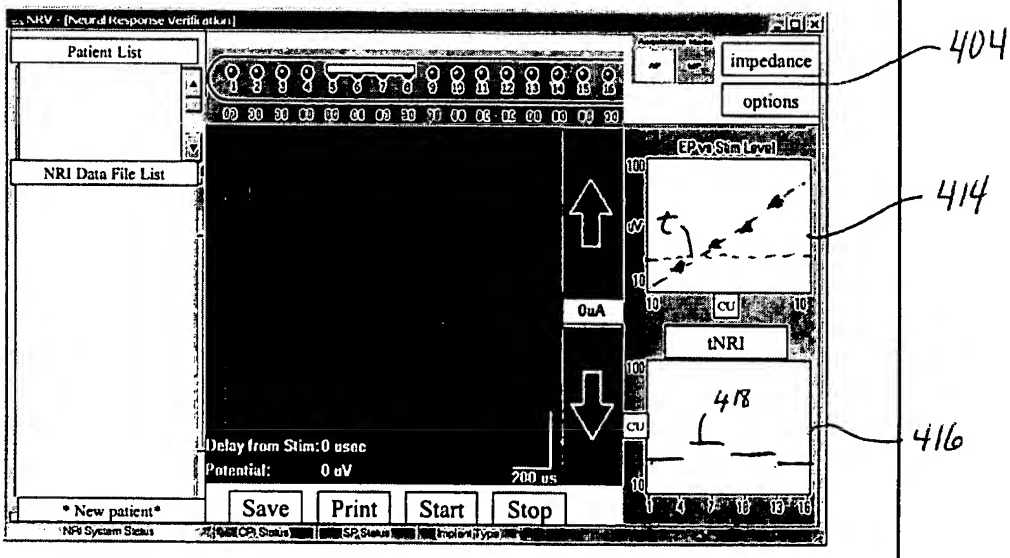
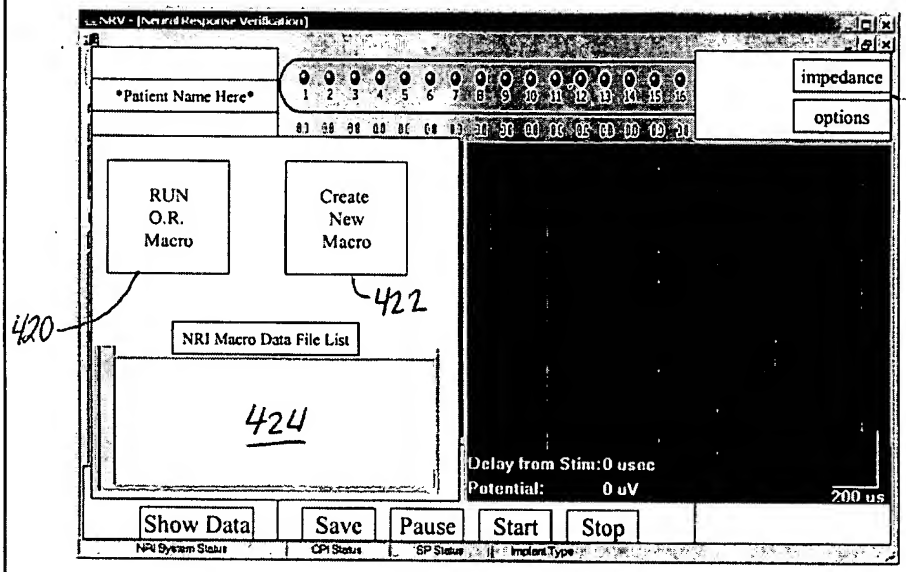


FIG. 6C

Selecting "Macro" allows one to run predefined values (or enter new value sets, monitor the data collection or recall previous collected data and re-run with the same stim params)



404

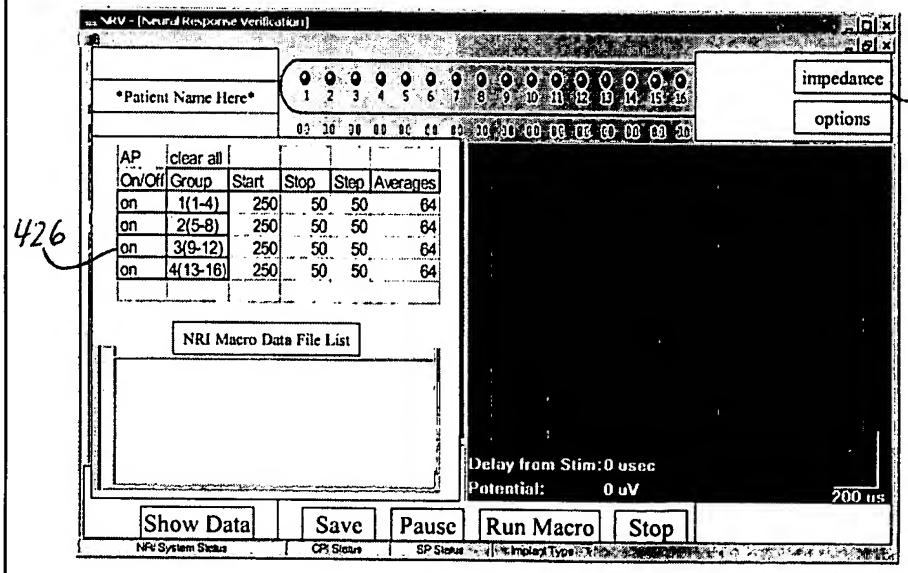
420

422

424

FIG. 6D

Selecting "Macro" allows one to run predefined values (or enter new value sets, monitor the data collection or recall previous collected data and re-run with the same stim params)



404

426

FIG. 6E

Selecting "Analysis" from the Macro screen shows the tNRI values computed from the I/O function that are displayed in the same units as the HiRes programs

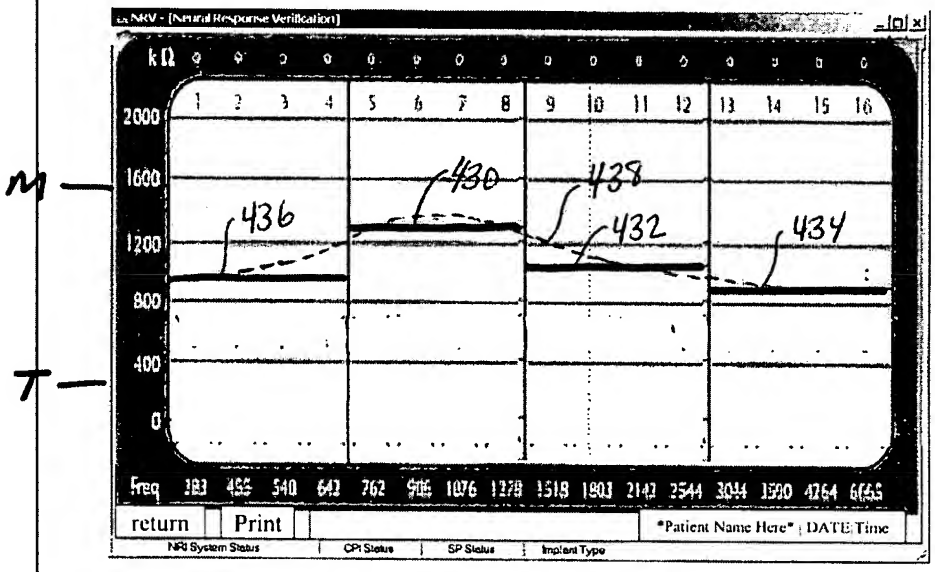


FIG. 6F

An example of a possible display of the data collected by this algorithm By clicking on the "group" that was stimulated together, one can see how the tNRI was computed from the input/output function and/or inspect Waveforms as well as deselect waveforms from the computation

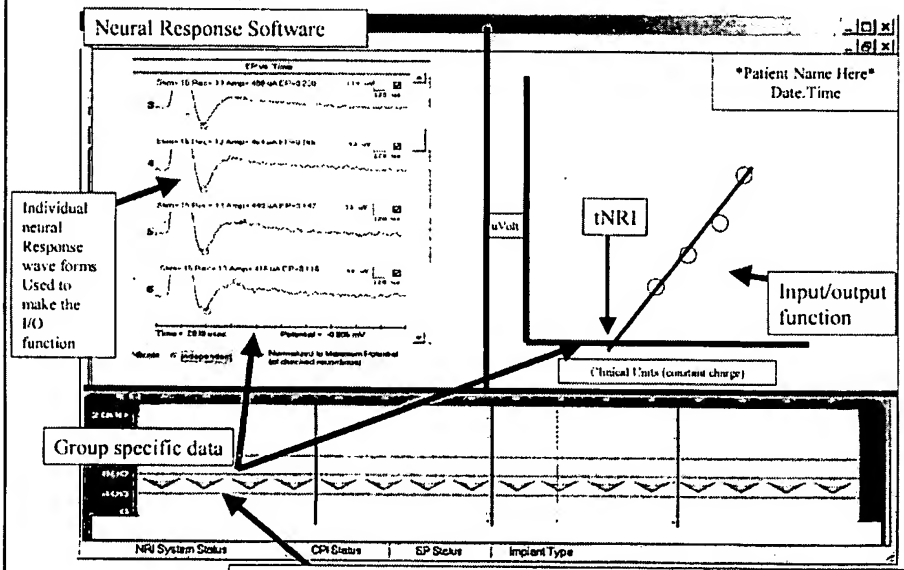


FIG. 6G